
5.9 Water Resources

Water resources are essential to maintaining human health, fish and wildlife habitat, and vegetation. These resources can be affected by roadway projects because increased impervious surfaces can lead to changes in water movement, degrade the surface waters that drain to streams and, thereby, affect natural habitats. These changes can also influence flooding effects and groundwater recharge¹.

The Renton to Bellevue Project will benefit local water quality and baseline hydrology by treating almost twice as much impervious surface as the project will create.

How did we evaluate water resources for the Renton to Bellevue Project?

To identify water resources within the Renton to Bellevue project area, WSDOT scientists reviewed numerous maps and plans, geographic information system databases, aerial photographs, water quality studies, databases on point sources (such as pipes, ditches, channels, and wells), agency web pages, and other recent data.

What water resources are found in the project area?

Natural water resources typically include surface water (also in the form of stormwater), floodplains, lakes, wetlands, and groundwater. Within the Renton to Bellevue project area, a wide range of these resources exists.

Surface Water

Surface waters are waters stored or flowing at the earth's surface including natural bodies of water (rivers, lakes, and wetlands), as well as water in manmade storage and conveyance facilities (lakes, detention ponds, and piped drainage systems). Discharges to these waters are regulated by the Clean Water Act.

¹ The infiltration of water into the earth. Groundwater recharge may increase the total amount of water stored underground or only replenish supplies depleted through pumping or natural discharge.



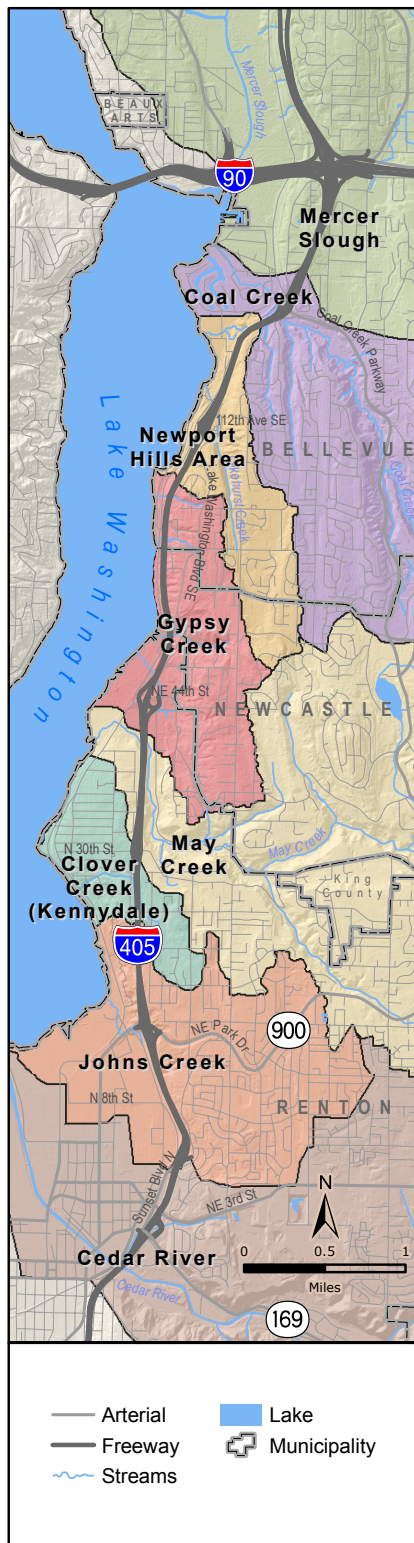
Lower Clover Creek

Please refer to the Renton to Bellevue Project Water Quality; Surface Water and Floodplains; Water Quality; and the Geology, Soils and Groundwater discipline reports in Appendices T, U and Y, respectively, (on CD), for a complete discussion of water resources analyses.

DID YOU KNOW?

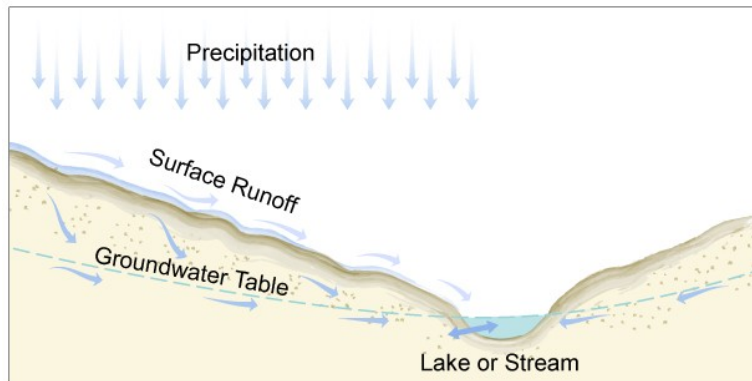
The Water Pollution Control Act, better known as the **Clean Water Act**, 33 USC 1251 et seq., provides for comprehensive federal regulation of all sources of water pollution. It prohibits the discharge of pollutants from non-permitted sources. In Washington, authority to administer the Clean Water Act is delegated primarily to the U.S. Army Corps of Engineers and the Washington State Department of Ecology.

Exhibit 5.9-2: Watersheds



Effects to surface waters can occur when pervious (permeable) areas are converted to impervious (hard, impermeable) surfaces such as pavement. When surface water, sometimes in the form of stormwater, cannot be absorbed by the ground, runoff volumes increase. Changes in runoff volumes and velocities can cause stream bank erosion, streambed scouring, and increased flooding risks (Exhibit 5.9-1).

Exhibit 5.9-1: How does water move across and below the ground?



The Renton to Bellevue project area includes eight watersheds²: Cedar River; Johns Creek; Clover Creek; May Creek; Gypsy Creek; Newport Hills; Coal Creek; and Lake Washington/Mercer Slough Wetland. The main streams crossing I-405 are Johns Creek, May Creek, and Coal Creek. The main receiving waters for the project are the Cedar River, Mercer Slough, and Lake Washington.

Additional small tributaries that drain to Lake Washington, which cross or run parallel to I-405 and receive runoff from within the project area, are also part of the project's affected environment. Exhibit 5.9-2 shows the area's watersheds.

Groundwater

There are two general aquifer systems that will be encountered along the I-405 Corridor: the "alluvial aquifers" and the Uplands Aquifer System. The alluvial aquifer system includes alluvium deposited along the various rivers, streams, and creeks bisecting the project corridor. Within the project area, the alluvial aquifer system includes alluvial deposits of the Cedar River, alluvial fan deposits of May Creek, and

² A geographic region within which water drains into a particular river, stream, or other body of water.

sediments along Coal Creek. These aquifers are unconfined systems. The most important of the alluvial aquifers is the Cedar Valley Sole Source Aquifer, the source of the City of Renton's water supply (see Exhibit 5.9-3). The depth to groundwater in the Cedar River alluvium is generally less than 25 feet. Groundwater in the May Creek alluvial aquifer is around 15 feet below ground surface, and groundwater in the Coal Creek alluvium is around 15 feet below ground surface where it crosses the Renton to Bellevue Project. The Upland Aquifer System is located in glacial and interglacial soils throughout much of the project area.

Groundwater flow in the North Upland Aquifer System is not well characterized; however, recharge is thought to be from infiltration of precipitation and septic drainage from residential development. The alluvial aquifers are unconfined systems.

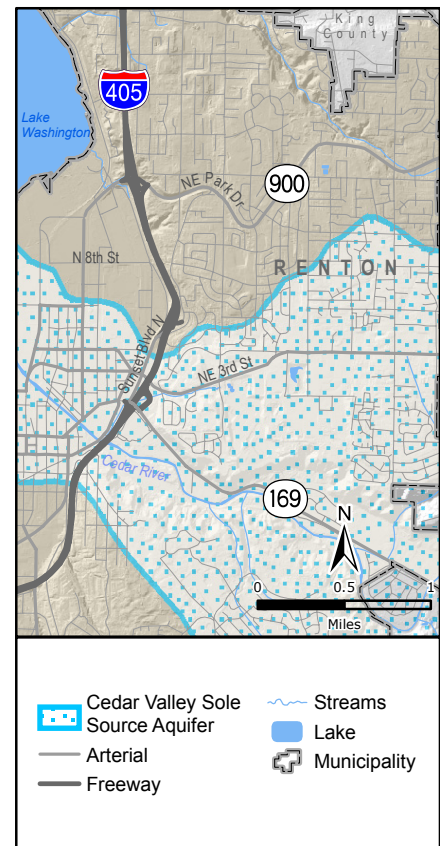
Floodplains

The Renton to Bellevue Project does not physically encroach on any existing 100-year floodplain designated as a Special Flood Hazard Area and will not affect downstream or upstream flood levels. The Renton to Bellevue Project will create no new stream crossings, although the locations of new cross-culverts under I-405 may change slightly. Each culvert and bridge that will be modified or replaced represents an opportunity to improve conveyance of floodwaters, and provide for fish passage. As a result, each structure is being designed so that negative effects on floodplains in the study area will be avoided.

How is stormwater from I-405 currently managed?

The existing I-405 roadway within the Renton to Bellevue project area has about 162 acres of impervious surfaces. Currently, the stormwater runoff drains to nearby streams or municipal storm drainage systems and ultimately to Lake Washington. Cross-culverts along the project corridor convey upstream (off-site) runoff from the east. These cross-culverts also convey some roadway (on-site) runoff to urban creeks, small watercourses and urban storm drains

Exhibit 5.9-3 Cedar Valley Sole Source Aquifer



What is a sole source aquifer?

EPA defines a sole or principal source aquifer as one that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer. These areas can have no alternative drinking water source(s) that could physically, legally, and economically supply all those who depend upon the aquifer for drinking water. For convenience, all designated sole or principal source aquifers are referred to as "sole source aquifers."

What are best management practices (BMPs)?

Best management practices for stormwater are actions or structures that reduce or prevent pollutants from entering stormwater and degrading water quality. There are many different types of BMPs – some are treatment technologies, such as stormwater treatment ponds. Others are typical measures that can be implemented as part of a project, such as sweeping streets to eliminate debris. Some BMPs are permanent features of a project, others can be temporary measures used during construction.

What is a temporary erosion and sediment control (TESC) plan?

The TESC plan describes the measures to be used during construction to protect Waters of the State from degradation due to sediment transport or water pollution. These measures may include the use of temporary BMPs.

How will construction affect water resources in the project area?

The Renton to Bellevue Project is being designed to comply with WSDOT's *Highway Runoff Manual* and *Hydraulics Manual*. Best management practices from the *Highway Runoff Manual* have been incorporated into the design.

Construction activities are expected to include the building of new culverts, stream crossings, new storm drain systems, enhanced water quality treatment facilities, and paving. These activities will affect water quality and water quantity as described below.

Construction effects to water quality

Project construction may have minor effects on water quality of the small tributaries; however, the effects will be temporary. No long-term adverse effects on receiving streams or Lake Washington are anticipated.

WSDOT will prepare a temporary erosion and sediment control (TESC) plan and a spill prevention control and countermeasures (SPCC) plan prior to initiating construction. Implementing these plans will minimize erosion effects, decrease the sediments entering receiving waters from the construction area, and protect against effects from harmful material spills to streams.

Automotive-related substances, such as petroleum hydrocarbons and heavy metals, are another concern during construction. These substances can be found in staging areas, on temporary roads, or on other work surfaces such as the freeway. If discharged directly to surface waters, these contaminants can reach concentrations that are toxic to aquatic life. The SPCC plan will specify that equipment fueling and maintenance and storage of fuels and toxic materials can only take place away from drainage courses. The SPCC plan will also specify measures to be taken in the event of a spill.

Construction effects to water quantity

Construction of the I-405 crossings over May Creek and Coal Creek, and over other small watercourses and streams will require some in-water work during placement and/or removal of piers, columns, abutments, culverts, and riprap or other bank armoring. The in-water work can create temporary floodplain encroachments, which can affect flood levels if a large storm event were to occur during construction. After construction, the temporary encroachments will be removed. In accordance with applicable design guidelines, the temporary construction encroachments will be the minimum necessary to accomplish the work. WSDOT will not allow any in-water construction work to take place except during seasonal work windows established to protect fish, unless prior approval has been obtained from fisheries resource agencies.

There will be increased amounts of runoff during construction. Erosion and sedimentation control BMPs implemented during construction will help prevent downstream flooding, erosion, and sedimentation. The increased runoff will not have any appreciable effect on Lake Washington because of the lake's large size and volume in comparison to the small amount of runoff from the freeway. Other waterbodies that convey water to Lake Washington will each receive a small amount of flow from the construction areas. Each waterbody should have sufficient capacity to convey the flow without increasing flood risk.

How will the project affect stormwater?

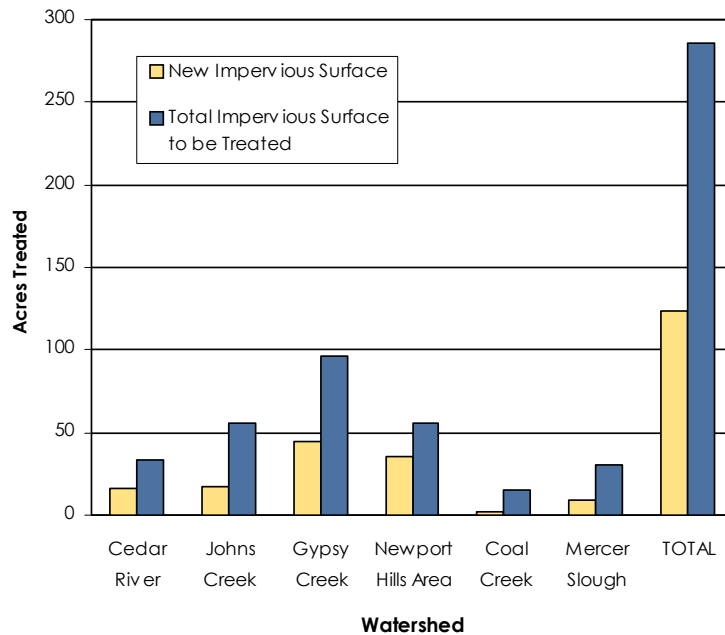
WSDOT will construct a new stormwater collection, conveyance, and water quality treatment system. Stormwater management improvements include off-site drainage crossings and the replacement of many of the existing culverts with new fish-passable culverts and structures. Many culverts and bridges will be resized to improve flow capacity to handle the increase in peak storm flows that has resulted from the urbanization of the watershed above I-405 since the freeway was built.

Compared with existing conditions, collectively, these changes will benefit the way surface water runoff from the project is managed (Exhibit 5.9-4). The Renton to Bellevue Project will

What is a spill prevention control and countermeasures (SPCC) plan?

An SPCC plan is required on all WSDOT contracts regardless of project size. The plan includes planning and recognition of potential spill sources as well as response procedures and reporting requirements.

Exhibit 5.9-4: Stormwater treatment



improve water quality and conveyance and reduce some localized flooding potential.

What is enhanced water quality treatment?

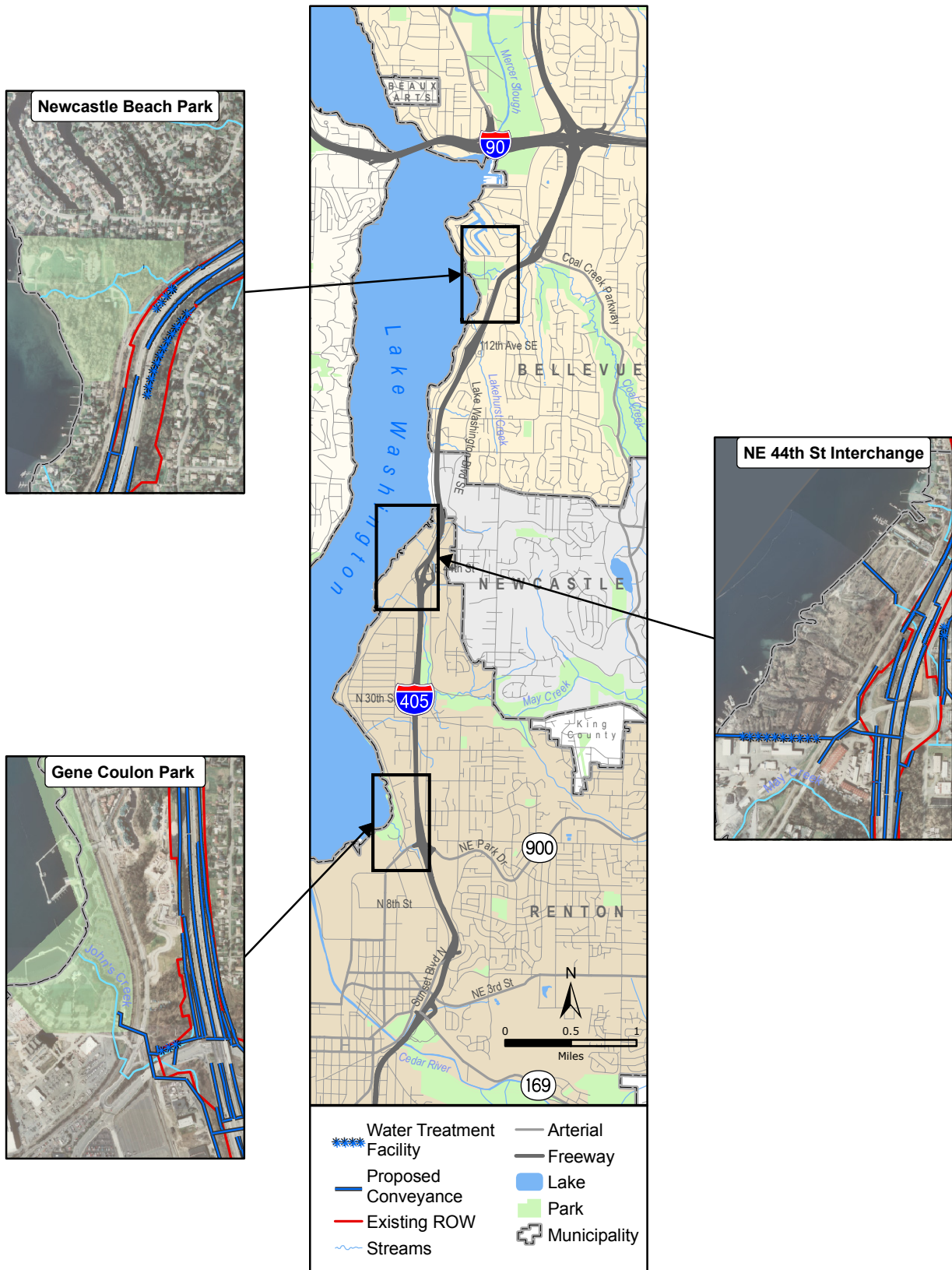
Enhanced water quality treatment is the use of BMPs to capture dissolved metals. The performance goal for enhanced treatment is 50-percent removal of certain metals.

The proposed project will include enhanced water quality treatment facilities consisting of ecology embankments. These facilities will provide enhanced treatment for the proposed 124 acres of new impervious surfaces, and 162 acres (a total of 286 acres or approximately 176 percent of new impervious surfaces within this portion of I-405) of presently untreated impervious surfaces (Exhibit 5.9 5).

Four pollutants (suspended solids, zinc, dissolved zinc, and phosphorous) are important because sufficient data exists on these constituents to estimate pollutant loads based on traffic volumes. Elevated levels of suspended solids are a concern because cloudy water can directly impair aquatic life. Suspended solids in runoff can also indirectly degrade downstream receiving waters because many other pollutants can absorb onto the particles.

Total and dissolved zinc represent heavy metals impacts. WSDOT also evaluated phosphorus because of its potential to increase oxygen depletion in streams and lakes. Fecal coliform, another pollutant associated with streams in the project area, is typically not associated with highway runoff.

Exhibit 5.9-5: Stormwater treatment facilities

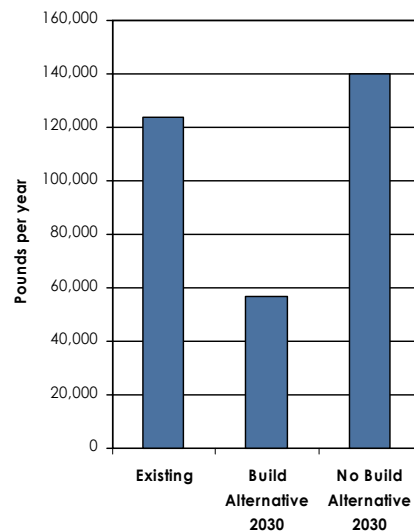


In-stream temperatures can also influence water quality. Temperatures above water quality standards are functions of ambient air temperature, surface area, stream volume, and shaded riparian cover. Stormwater runoff is generally a minor consideration affecting in-stream temperatures, since the vast majority of runoff events do not occur in summer or early fall when stream temperatures tend to be elevated.

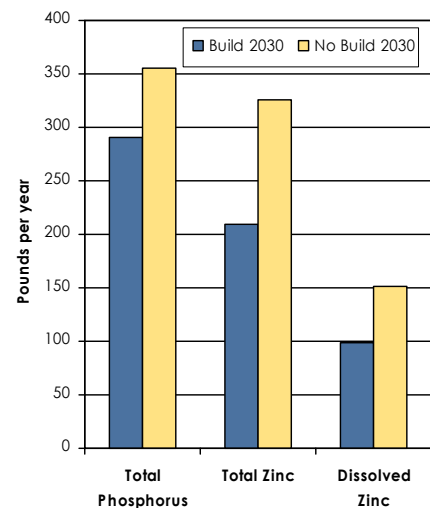
Overall, the proposed project will improve water quality with a net decrease in the annual pollutant loading of total suspended solids, total phosphorus, and zinc (Exhibit 5.9-6) because of the increased amount of water quality treatment provided by the project. Most notably, the proposed treatment will reduce pollutants entering the main receiving water, Lake Washington.

Exhibit 5.9-6: Pollutant loadings

Total suspended solids



Total phosphorus, zinc, and dissolved zinc



The proposed Renton to Bellevue improvements will increase the amount of impervious surface (pavement) in the area. Stormwater runoff from these surfaces will be discharged after treatment directly to surface water drainages, which will decrease the amount of rainfall currently infiltrating and recharging aquifers. The aquifers that can be most affected are the alluvial aquifers—the Cedar Valley Sole Source Aquifer, May Creek, and Coal Creek alluvial aquifers.

However, based on our preliminary estimates, this additional pavement will not present adverse effects. The amount of recharge that will be lost to any of these aquifers will be insignificant.

WSDOT has well-established design, operation, and maintenance practices for managing the type of soil, geologic, and groundwater conditions anticipated along the project corridor. Thus, long-term effects are expected to be minimal and consistent with other projects of this type. The amount of recharge that will be lost to the Cedar Valley Aquifer from the additional impervious pavement of about 16 acres over potential recharging areas is about 18 gallons per minute (gpm). When comparing the Cedar Valley Aquifer yield to the City's wells of about 9,000 gpm, this reduction in recharge quantity effect is minimal.

What measures are proposed to avoid or minimize effects to water resources during construction?

Several measures will be incorporated into construction plans and specifications to reduce effects to water resources.

- WSDOT will protect groundwater with the use of standard BMPs.
- WSDOT will prepare and implement a temporary erosion and sedimentation control plan and a spill prevention control and countermeasure plan.
- WSDOT will not allow any in-water construction work to take place except during seasonal work windows established to protect fish, unless prior approval has been obtained from fisheries resource agencies.
- WSDOT will identify and develop staging areas for equipment repair and maintenance away from all drainage courses. Washout from concrete trucks will not be dumped into storm drains or onto soil or pavement that carries stormwater runoff. Thinners and solvents will not be used to wash oil, grease, or similar substances from heavy machinery or machine parts. WSDOT will designate a washdown area for equipment and concrete trucks.
- WSDOT will ensure that fuel and chemical storage, fueling operations for construction vehicles, and equipment during construction is located within

secondary containment areas. These areas will be surfaced with an impermeable material and sized to contain the volume of stored fuel and/or chemical.

- WSDOT will locate spill response equipment at regular and specified intervals along the project alignment.
- WSDOT will identify and develop staging areas for equipment repair and maintenance away from all drainage courses.
- WSDOT will take added measures during construction within the Cedar Valley Sole Source Aquifer to protect the aquifer, such as prohibition of fuel and chemical storage and refueling operations. Also, construction specifications will require stormwater collection with either a lined or piped conveyance system within the Aquifer Protection Area (APA). Stormwater will be directed and discharged outside of the APA to prevent any possible degradation of water quality.
- WSDOT will conduct construction within the City of Renton's APA Zones 1 and 2, in compliance with Washington State Wellhead Protection Requirements outlined in WAC 246-290-135(4) and the City of Renton Municipal Code RMC 4-9.
- WSDOT will ensure that fuel and construction chemicals will not be stored within the City of Renton's APA Zone 1 and minimize storing fuels and chemicals within Renton's APA Zone 2.
- WSDOT will conduct groundwater monitoring to monitor for spills that can affect the Cedar Valley Aquifer. If necessary, existing City of Renton monitoring wells can be supplemented with additional monitoring wells at key locations and used for monitoring water quality during construction activities in the APA Zone 1.
- WSDOT will ensure that any fill over 50 cubic yards in quantity placed over Renton's APA Zone 1 be certified by a professional engineer or geologist that the fill meets Model Toxics Control Act (MTCA) cleanup standards.
- WSDOT will not place imported contaminated fill during construction.

- WSDOT will ensure that imported fill meets MTCA Method A or B soil cleanup standards (WAC 173-340-740) for unrestricted use.
- WSDOT will develop a fill evaluation and testing plan prior to commencing construction activities. The fill testing plan will also apply to suspect excavated soils encountered during construction.
- If analytical testing is required, WSDOT will ensure that imported fill soils are analyzed before arriving at the construction site.
- WSDOT will ensure that all sampling is performed by a professional engineer or geologist.

What measures are proposed to avoid or minimize effects to water resources during operation?

- Stormwater discharge to the Cedar River will be downstream of the City of Renton's RW-1, 2 and 3 Group A wells.
- WSDOT will construct new I-405 roadway over the Renton APA Zone 1 with an impervious liner underneath the pavement for additional protection from spills escaping the stormwater collection system.
- WSDOT will ensure that fuel and chemicals spills from vehicles are captured and contained by the stormwater collection and detention system. The stormwater system will detain spills in either vaults or ponds. The detention vault or pond will have shut-off capability for containing a spill or release.
- WSDOT will establish a plan in compliance with Washington State Wellhead Protection Requirements outlined in WAC 246-290-135(4) and the City of Renton Municipal Code RMC 4-9 to ensure a higher level of protection for the City of Renton's APA Zones 1 and 2.
- Within APA Zones 1 and 2, WSDOT will construct either a lined or piped stormwater conveyance system. Stormwater will be directed and discharged outside of the City of Renton's APA Zone 1 Wellhead Protection Area.
- WSDOT will ensure that the roadway and access ramps over Renton's APA Zone 1 will have berms to

collect and route major spills to the stormwater collection system. The system will be constructed in accordance with City of Renton requirements for sanitary sewage facilities in APA Zone 1 areas and will be sized to contain a liquid spill from a double tanker.

- WSDOT will control stormwater so that peak and base flows of receiving waters are not adversely affected by treated stormwater discharge from the expanded impervious surface areas created by the project.